BOOK REVIEWS

The Place of Illusory Experience in a Realistic World. By EDWIN B. HOLT. In *The New Realism.* New York, The Macmillan Co., 1912. pp. 491. Price $2.50 net.

The main contention of the author of this essay is that all mental phenomena are the same in kind as the phenomena of the physical world. He argues (1) that this thesis holds for sensation, perception and image; and (2) that contradictions, which constitute the content of an illusory experience, are not subjective, but objective, in nature. He devotes the greater amount of his space to the development of the first of these two arguments, which is also the more interesting to the psychologist.

Errors of space and of time receive scant attention. It is enough to show that for each of them an analogous phenomenon may be found in the physical world. If one presses an eyeball out of place, and keeps both eyes open, one will see double; so does a stereoscopic camera. "Or, again, an astigmatic eye distorts its object; so does a roughly cut glass lens." We see some heavenly body many years behind time: what advantage over us has the photographic plate? Many of the errors in secondary qualities are parallel to those of space and time; but the complementary after-image and the pure hallucination offer greater difficulty. The former is met by a new theory of vision based on Meisling's view that the cones resonate to waves of light. It has been found that, when the capacity of the receiving mast of a wireless telegraph system is tuned to a given length of Hertzian wave, it is *ipso facto* tuned to a second wave-length as well, which may be regarded as its complementary wave. Light waves and Hertzian waves are closely related physically, so that, if the view of Meisling is correct, the complementary colors of vision are nothing but a true presentation in consciousness of the fact of complementary attunement of light-resonators. The case of pure hallucinations raises two questions: (1) How can these purely hallucinatory secondary qualities have any sort of being other than a subjective and mental being? and (2) How can they assert *themselves to be* or how can the *realist* pretend to *assert them to be* the real object? The answer to the first question is long and involved. The doctrine of specific nerve-energies is first attacked, on the ground that physiologists have been unable to discover any trace of specific nerve-energies in the differences between nerve-impulses, nerve-fibrils, cortical cells and synapses. Furthermore, a satisfactory theory of specific nerve-energies must furnish an explanation, not only of qualitative differences between sense modes, but also of qualitative differences within sense modes. No theory, not even Helmholtz' theory of audition, meets this demand with success. Specific nerve-energies must, therefore, be given up. The author admits that there are qualitative differences; but he thinks that they can be analyzed into quantitative differences, and for this reduction he carefully prepares the way. Physiologists have found that the nervous impulse presents periodic fluctuations of a frequency much higher than had previously been suspected. The nervous response follows the rate of stimu-

lation, and the periodicity of the impulse may rise as high as one thousand in the second. This discovery is accepted as the physiological basis of the author's explanatory psychology. Recent experiments in audition, particularly those of Lord Rayleigh, point to a vibratory theory of audition; and a combination of the Rutherford and Meyer theories proves adequate to the facts. In the field of vision, the resonance theory falls readily under the new point of view. The light waves may act photo-chemically on the visual purple of the rods, and physically on the cones. Still, of course, the question remains: How do the periodic vibrations become qualities? And the answer is that the qualities are a kind of form-qualities, "in which the temporal subdivisions are so small that the time-sense cannot discriminate them, whereas the frequency-magnitude, or the *density,* still remains perceivable." But it is not the factor of density of the nervous impulse that is the secondary quality; it is rather the density of the series of some relatively primitive sensation which is the secondary quality. As form-qualities these densities have two characteristics which differentiate them from other form-qualities: (1) their principle of organization is time, and (2) they are of a lower order than the *Gestaltqualitäten* with which we are familiar. The task of psychology, now, is to analyse all form-qualities, as far as possible, by introspection. Of the original five senses, taste and feeling have already proved to be fusions; the clang can be analysed into partials, orange into red and yellow, and even green is phenomenally yellow and blue. When, however, introspection can go no further by its usual method, it may try a new method. A quality that lies in a series between two others may be eliminated, on the ground that it possesses the same ingredients as these two. Eventually, then, we shall get down to a single element, such as one kind of atom, variously organized, such as in three sizes of molecule. This is the primitive entity whose density constitutes a secondary quality. It is not mental or subjective in substance; on the contrary, it is the same in substance as the physical element.

This reduction completes the author's first argument. Realism is able to assert the reality of an hallucination, because the nervous system is able to generate within itself nerve-currents of frequencies whose density-factor is the same as that of ordinary peripheral stimulation. It remains to say a word concerning his theory of consciousness. "Consciousness is the group of (neutral) entities to which a nervous system, both at one moment and in the course of its life history, responds with a specific response." Either the object, or the color (secondary quality) on the object, is *specifically responded to* if the nervous system can pick up and transmit the vibrations which are sent out by it. Consciousness, moreover, is not in the skull; it is out there in space, precisely where it appears to be.

The author next takes up the problem of error. No thing, be it brickbat or image, can of itself assert anything about reality or unreality. Such a bare content is in logic known as a 'term.' A term, or system of terms, simply is, and is neither true nor false. Contradictions, however, may exist among sets of assertions or propositions about a term. A proposition is supplied by experience, and, if it be about a mental term, may coexist with this in the mind. Terms in relation which are physically impossible, as for example the round square, are also mentally impossible, *i. e.,* unthinkable. But the mind may entertain contradictory propositions about the round square; and physical laws, which are propositions, are habitually in a state of contradiction, as for example when two laws of motion oppose each other.

"A thought, then, which negates another thought is neither more nor less significant than a physical law which negates another physical law."

We have tried to give an abstract of the author's views as we understand them. We have not indicated in any degree the ingenious way in which the argument is presented, nor have we hinted at the apt illustration, the pleasing metaphor, the friendly sarcasm which abounds throughout. Our principal objection is that he writes as an advocate, and not in the dispassionate way in which scientific theories should be discussed. The acceptance of the argument as it stands means the acceptance of new theories of vision and audition, of a new kind of form-quality—to say nothing of the old, of a thorough-going atomism, and of a strange theory of consciousness. The author would agree that the only test of a theory is an appeal to the facts; we wish that he had at least indicated how his theory of vision would explain simultaneous contrast. Again, it is not quite fair, where there is some disagreement as to what are the facts, to choose one set of observations and entirely to ignore the others. For example, there are psychologists, who are aware of the stimulus-error and who work with spectral colors, and not with pigments, who still insist that orange is a simple quality. There is also good reason for believing that the rods are organs of night vision only. In which case the cones, according to the novel theory, must reasonate to white light. What would a resonator, tuned to a pair of wave-lengths, do with so complex a wave as that of white light? The author cannot say that each resonator picks out its own wave-length, for the retina would then be an analyser, and that would imply specific nerve-energies. Moreover, we should, in such case, be able to analyse mentally white light as we do a clang. Similar objections might be raised against the theory of hearing: we will only remark that Wundt, twenty years ago, considered such a theory, but declined to accept it because it cannot satisfactorily explain clang-analysis. As regards the view of secondary qualities as densities, one can only speculate. The sole evidence which the author brings to the support of his theory, the roughness and smoothness of the tapping experiment or of the flicker experiment, is hardly germane; for roughness and smoothness are not simple qualities, as is the quality of a color or a tonal sensation. If, however, we were to hazard a guess, we should agree with Montague that the author has given us an interesting explanation of intensity, but not an explanation of quality at all. As to form-qualities there is still the possibility, as Titchener has pointed out, that the problem of meaning is involved; so that, just as no content can of itself assert anything, so none can mean anything,—not even triangularity.

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Das Problem der Willensfreiheit. Von G. F. LIPPS. Leipzig, B. G. Teubner, 1912. pp. iv, 104.

This booklet, published in the series *"Aus Natur und Geisteswelt,"* is based on *Volkschulvorträge* delivered by the author at the University of Leipzig. Lipps accepts Kant's statement of the problem of freedom: that man is at once free and determined; but he seeks a solution more adequate than that of Kant. Instead of splitting hairs over the meaning of Freedom and Determinism, the author proposes to examine the essence of our own being and conduct, in an endeavor to solve thereby the puzzle of the free-determined character of our willing and acting. To this end, he presents in brief outline the part